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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/788,335	02/16/2001	David A. Jaffray	10546/42	6106
7590	04/20/2004		EXAMINER	
JOHN C. FREEMAN BRINKS HOFER GILSON & LIONE N B C TOWER, SUITE 3600 455 NORTH CITYFRONT PLAZA DR. CHICAGO, IL 60611			HO, ALLEN C	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 04/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/788,335

Applicant(s)

JAFFRAY ET AL.

Examiner

Allen C. Ho

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23, 26-35, 64-80 and 94-128 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-22, 26, 28-35, 64-70, 73-80, 94-96, 99-110, 112-118 and 120-127 is/are allowed.
- 6) ☒ Claim(s) 23, 27, 71, 72, 97, 98, 111, 119 and 128 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the subject matter claimed in claim 23 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 23, 27, and 111 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 23 claims a radiation therapy system comprising a radiation source, a cone-beam computed tomography system comprising a gantry with two arms, and the gantry rotates about

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two axes. Although the embodiment shown in Fig. 22 has two arms (C-arm) and two axes of rotation, it does not have a radiation source.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 71, 72, 97, 98, 119, and 128 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swerdloff *et al.* (U. S. Patent No. 5,661,773) in view of Hu (U. S. Patent No. 5,663,995) and Roos *et al.* (U. S. Patent No. 6,041,097).

With regard to claims 71, 72, 97, 98, 119, and 128, Swerdloff *et al.* disclosed a method of treating an object with radiation, comprising: moving a radiation source (12) about a path; directing (51) a beam of radiation (14) from the radiation source towards the object; emitting (46) an x-ray beam from an x-ray source towards an object (17); detecting (50) x-rays that pass through the object due to the emitting an x-ray beam with an imager; generating (60) an image of the object from the detected x-rays, wherein the generating comprises forming a computer tomography image of the object based on the detected x-rays; controlling (51, 48, 52, 54) the path of the radiation source based on the image (column 14, lines 9-13); and emitting a second set of x-rays (12) that has an intensity and energy greater than the x-rays emitted from the x-ray source (column 1, lines 36-45).

However, Swerdloff *et al.* failed to teach: emitting an x-ray beam in a cone beam form and detecting x-rays that pass through the object due to the emitting an x-ray beam with an amorphous silicon flat-panel imager.

Hu taught that helical scan could be performed to reduce the total scan time required for multi-slice imaging (column 1, lines 48-59). Furthermore, Hu taught that cone-beam helical scanning provides improved slice profiles, greater partial volume artifact reduction, and faster patient exam speed as compared to fan-beam helical scanning (column 2, lines 3).

Roos disclosed a cone-beam CT system comprising a cone-beam x-ray source (18) and an amorphous silicon flat panel imager (20). Roos taught that the amorphous silicon flat panel imager has higher spatial resolution than conventional CT detectors (column 5, lines 16-33).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to replace slice CT imaging disclosed by Swerdloff *et al.* with a cone-beam computer tomography system, since a person would be motivated to gain the advantages offered by a cone-beam CT system.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ an amorphous silicon flat panel imager, since a person would be motivated to use an imager that has higher spatial resolution, permitting detailed examination of a region of interest.

Allowable Subject Matter

6. Claims 1-22, 26, 28-35, 64-70, 73-80, 94-96, 99-110, 112-118, and 120-127 are allowed.
7. The following is a statement of reasons for the indication of allowable subject matter:

With respect to claims 1-22, 28-35, and 103-110, although the prior art discloses a radiation therapy system comprising a radiation source, a con-beam computed tomography system comprising an x-ray source and a flat-panel imager receiving x-rays after they pass through the object, the imager providing an image of the object, and a computer controls the path of the radiation source based on the image, however the prior art fails to teach or fairly suggest that the image contains at least three-dimensional information of the object based on one rotation of the x-ray source around the object as claimed.

With respect to claims 26 and 112, the prior art fails to teach or fairly suggest a radiation therapy system comprising a gantry with a first arm portion and a second arm portion, wherein the x-ray source is attached to the first arm portion and the amorphous silicon flat-panel imager is attached to the second arm portion as claimed.

With respect to claims 64-69, 73-77, 95, 96, 99-102, 113-117, and 123-127, although the prior art discloses a method of treating an object with radiation comprising moving a radiation source about a path, directing a beam of radiation from the radiation source towards the object, emitting an x-ray cone-beam towards the object, detecting x-rays with a flat-panel imager, generating a computed tomography image from the detected x-rays, and controlling the path of the radiation source or a radiation treatment plan based on the image, however, the prior art fails to teach or fairly suggest generating a computed tomography image, wherein the image contains at least three-dimensional information of the object based on one rotation of the x-ray source around the object as claimed.

With respect to claims 70 and 118, the prior art fails to teach or fairly suggest a method of treating an object with radiation comprising rotating the object about a second axis of rotation relative to the x-ray source and the flat-panel imager as claimed.

With respect to claims 78-80, 94, 120-122, the reasons for allowance were set forth in the previous office action.

Response to Arguments

8. Applicant's arguments, filed 26 January 2004, with respect to rejection of 6, 8, 10, 12, 13, 26, 65, 70, 71, 72, 77, 95, 97, and 98 under 35 U.S.C. § 112 have been fully considered and are persuasive. The rejection of 6, 8, 10, 12, 13, 26, 65, 70, 71, 72, 77, 95, 97, and 98 has been withdrawn.

9. Applicant's arguments, filed 26 January 2004, with respect to rejection of 23 and 27 under 35 U.S.C. § 112, first paragraph, have been fully considered and are not persuasive. The rejection of 23 and 27 is being maintained.

With respect to claim 23, although the examiner agrees with the applicants that a C-arm has two arms, the examiner still fails to see how a radiation therapy system that comprises a radiation source and a cone-beam computed tomography system could have a gantry that rotates about two axes. Fig. 22 shows only a cone-beam computed tomography system without a radiation source.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (571) 272-2491. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached at (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Allen C. Ho

Allen C. Ho
Patent Examiner
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